WE CLAIM:

1. A monolithically integrated device having a twin waveguide structure, wherein optical power is propagated by even and odd modes of light, comprising:

an active region for emitting light;

a passive region for propagating said light, said passive region coupled to said active region;

wherein said even and odd modes are divided unequally between said active and passive region.

2. The device according to claim 1 wherein one of said even and odd modes is primarily confined to said active region and remaining mode is primarily confined in said passive region.

3. The device according to claim 1 wherein said one of said modes primarily confined to said active region experiences higher gain than said remaining mode.

4. The device according to claim 1 wherein approximately 70% or more of one of said even and odd modes is confined to the active region.

5. The device according to claim 1 wherein said device is fabricated in a single epitaxial step.

6. The device according to claim 1 wherein light is guided via waveguides in active regions and passive regions, wherein said waveguides are defined after growth.

7. The device according to claim 1 wherein said active region is configured to include a lateral taper.

8. The device according to claim 7 wherein said lateral taper follows an exponential curve.

9. The device according to claim 1 wherein said active region incorporates a shallow ridge waveguide and has an effective index of refraction higher than that for said passive region.

10. The device according to claim 1 wherein said device is a laser.

11. The device according to claim 10 wherein said laser is driven by at least one quantum well.

12. The device according to claim 11 wherein a gain for said laser is provided by at least one quantum well.

13. The device according to claim 12 wherein a gain for said laser is higher for one of said modes of light than for other of said modes of said light.

14. The device according to claim 1 wherein said device is a semiconductor optical amplifier.

15. The device according to claim 14 wherein said semiconductor optical amplifier is embodied as a traveling-wave optical amplifier.

16. The device according to claim 14 wherein a gain for said semiconductor optical amplifier is higher for one of said modes of light than for other of said modes of said light.

17. The device according to claim 1 wherein said passive region incorporates a grating region for reflecting back selected frequencies of light from said active region.

18. A monolithically integrated device having a vertical asymmetric twin waveguide structure, wherein optical power is propagated by even and odd modes of light, comprising:

a semiconductor substrate;

a passive waveguide supported by said substrate; and

an active waveguide coupled to said passive waveguide;

wherein said passive waveguide and said active waveguide have different effective indices of refraction.

19. The device according to claim 18 wherein said active waveguide and said passive waveguide have different vertical thicknesses.

20. The device according to claim 18 wherein said active waveguide and said passive waveguide have different indices of refraction.

21. The device according to claim 18 wherein one of said modes of light is confined in said active waveguide with approximately a 70/30 split ratio compared to the other of said modes of light.

22. The device according to claim 18 wherein one of said modes of light is confined in said passive waveguide with approximately a 30/70 split ratio compared to the other of said modes of light.

23. The device according to claim 18 wherein one of said modes of light has higher gain than said other mode.

24. The device according to claim 18 wherein said passive waveguide incorporates a grating region for reflecting back selected frequencies of light from said active waveguide.

25. A monolithically integrated device for transferring optical power by propagation of even and odd modes of light comprising:

a semiconductor substrate;

a passive waveguide supported by said semiconductor substrate;

an active waveguide coupled to said passive waveguide; and

a tapered region laterally incorporated into said active waveguide for coupling one of said modes of light from said active waveguide to said passive waveguide.

26. The device according to claim 25 wherein said tapered region facilitates low-loss coupling of said modes of light.

27. The device according to claim 25 wherein said tapered region embodies an exponential taper.

28. The device according to claim 25 wherein said tapered region is formed by etching.

29. The device according to claim 25 wherein said passive waveguide incorporates a grating region for reflecting back selected frequencies of light from said active waveguide.

30. A monolithically integrated device for transferring optical power by propagation of even and odd modes of light comprising:

a semiconductor substrate;

a passive waveguide coupled to said semiconductor substrate; and

an active waveguide coupled to said passive waveguide, said active waveguide having two ends and a middle region;

wherein said passive waveguide and said active waveguides have different effective indices of refraction and wherein at least one of said ends of said active waveguide is tapered to be substantially thinner than said middle region.

31. The device of claim 30 wherein said device is an active device.

32. The device of claim 31 wherein said at least one tapered end facilitates coupling of light from said active device to a passive device.

33. The device of claim 30 wherein the gain of one of said modes is higher than the gain of said other mode.

34. The device of claim 30 wherein said at least one tapered end facilitates low-loss coupling of said modes of light.

35. The device of claim 30 wherein said at least one tapered end is exponentially tapered.

36. The device of claim 30 wherein said passive waveguide incorporates a grating region for reflecting back selected frequencies of light from said active waveguide.

37. A method of fabricating a photonic integrated device having an asymmetric twin waveguide structure, comprising the steps of:

applying a passive waveguide on a substrate;

applying an active waveguide on said passive waveguide, said active waveguide being arranged to have a different effective index of refraction than said passive waveguide; and

etching an active device on said active waveguide.

38. The method of claim 37 further comprising the step of:

etching a passive device on said passive waveguide.

39. The method of claim 37 further comprising the step of:

etching a tapered region on said active device.

40. The method of claim 37 further comprising the step of:

forming a grating region on said passive waveguide.

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